

# Asset Management

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## INTRODUCTION

Over the last two decades public sector agencies that own, operate and/or maintain physical assets have moved from a focus on expansion to preservation. More recently, these agencies also emphasize good business practices including embracing quality, recognizing the importance of strategic as well as tactical planning, valuing the integration of economics and engineering, and taking advantage of the information age. The systematic process in which these changes are taking place is referred to as asset management.

Given the size, extent and value of road and highway assets, and the importance of geotechnical engineering in the design, construction and maintenance of these assets, this paper focuses on highway assets. However, similar initiatives are being undertaken in the water and wastewater industry (see <http://www.epa.gov/owm/assetmanage/index.htm>), in building management (BICE, 2004), and for gas and electric utilities (see <http://www.epri.com/Portfolio/product.aspx?id=2029>). Similarly, asset management is practiced by private sector and at all levels of government. The focus here is on the public sector.

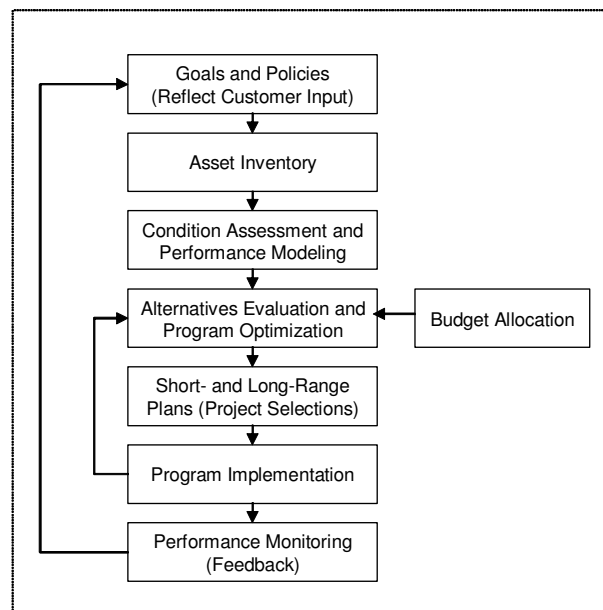
## Defining Asset Management

Asset management is the process for managing these infrastructure assets (McNeil et al. 2000). Asset management is also described as a strategic enterprise that combines engineering practices and analysis with sound business practices and economic theory (US DOT 1999). Implementing asset management is a challenge for highway agencies. Agencies can choose to either design and develop a new asset management system or integrate different platforms of existing management systems. Agencies also need to select the appropriate assets, actions, business processes, and asset management concepts (Cambridge Systematics 2002). A good asset management system should improve the assets cost effectively, while enhancing the credibility and accountability of the agency.

## Essential Elements of Highway Asset Management System

Asset management systems involve the development and implementation of structured processes to improve the decision-making capability of an agency. As shown in Figure 1, an overall framework for asset management systems (USDOT 1999) consists of asset inventory, condition assessment and performance modeling, maintenance alternative selection and evaluation, methods of evaluating the effectiveness of each

strategy, project implementation, and performance monitoring. System complexity substantially depends on the types of assets that are being managed and the available



**Figure 1. Generic Asset Management System Components (Modified from USDOT 1999)**

budgets or resources.

### STATE OF THE PRACTICE

Several resources are available to support asset management. The FHWA Office of Asset Management has produced numerous publications including the “Asset Management Primer” (US DOT, 1999) and case studies of experiences with asset management in state departments of transportation and other agencies. These publications are available from their website (<http://www.fhwa.dot.gov/infrastructure/asstmgmt/index.htm>)

Proceedings of conferences and reports from peer exchanges are also a rich source of information including research issues. To date six National Conferences and four peer exchanges have been conducted. In April 2005 an international scanning tour occurred and in September 2006 a domestic scanning tour was completed. The American Association of State Highway and Transportation Officials (AASHTO) and FHWA support a community of practice website – Transportation Asset Management Today – that provides links to a variety of resources including conference proceedings, the peer exchanges and scan reports. The website is <http://assetmanagement.transportation.org/>.

Through AASHTO and Transportation Research Board Committees, universities, conferences and peer exchanges several research projects have been completed, others are continuing, and new projects are being proposed. Examples are shown in Table 1.

**Table 1. Examples of Recent and Current Research Projects**

Status	Project	Source
Completed	Asset Management Guidance for Transportation Agencies	NCHRP Project 20-24(11)
	Analytic Tools to Support Transportation Asset Management	NCHRP Project 20-57
	Performance Measures and Targets for Transportation Asset Management	NCHRP Project 20-60
	Asset Management Data Collection Guide	AASHTO-AGC-ARTBA Task Force 45 Report
	Managing Selected Transportation Infrastructure Assets	Synthesis of Highway Practice 37-03
Ongoing	Developing an Asset Management Plan for the Interstate Highway System	NCHRP Project 20-74
	Optimization of Transportation Investment and Operations	Midwest Regional University Transportation Center (University of Wisconsin, Madison)
	Transportation System Management and Operations,	Midwest Transportation Consortium (Iowa State University)

### KEY ISSUES IN ASSET MANAGEMENT

Asset management is a data driven process. Improved, more efficient data collection (for example, the rolling wheel deflectometer), better data analysis, integration of data from existing and new sources, and improvements in the actual use of data to support decision making are key issues. These concepts are embraced in ongoing efforts to relate policy, planning, and asset management, and develop tools to support tradeoff analysis between different types of assets.

Central to these issues are performance measures. Appropriate performance measures not only support the decision making process but improve accountability. Using concepts such as remaining service life as a performance measure recognize both the short term and long term issues in asset management. Asset management is also important for supporting innovative financing strategies including public private partnerships, and the development of new strategies for accelerated construction.

At the same time, compared with the other countries, experiences with asset management in the United States have not involved confronting issues such as risk,

fundamental changes in how we deliver transportation services, and the long term resource constraints.

### **Asset Management and Geotechnical Infrastructure**

Management systems for geotechnical infrastructure have focused on a particular type of infrastructure. Bernhardt et al (2003) and Loehr et al (2004) document past experiences and develop a framework for managing geotechnical assets. However they do not address the data integration issues, and the fact that geotechnical assets play a critical supporting role for other types of management systems. Recent work on infrastructure interdependencies underscores the importance of understanding how individual assets contribute to the system.

### **CONCLUSION AND FUTURE DIRECTIONS**

Objective, data-based, reproducible, systematic approaches that can enhance the dialogue among decision-makers regarding the type and timing of capital investments to address preservation, capacity expansion, mobility, accessibility and operations are needed. However, there are still significant research gaps as well as issues related to the implementation of research results (Switzer and McNeil 2004). Key areas include quantifying the benefits of asset management, modeling costs and decisions, improving life-cycle cost analysis, benchmarking with other organizations, and the application of asset management concepts beyond pavements and bridges.

Despite these gaps, the last decade has seen significant progress in the application of asset management to highway networks. Most of these applications build on earlier versions of pavement management and bridge management, but they demonstrate the willingness of agencies to break down institutional issues to deliver transportation services that are better and more cost effective.

### **REFERENCES**

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